

REMARKS

Claims 1 and 4 have been objected to for certain informalities as noted on page 2 of the Office Action. As the Examiner will note, claim 1 has been amended to remove the informalities and claim 4 has been cancelled in the present application. Accordingly, it is believed that the Examiner's objections have been eliminated.

Claims 18-20 have been rejected by the Examiner under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Since claims 18-20 have been cancelled from the present application, it is believed that this rejection has been eliminated.

Claims 7 and 9 have been objected to as being inaccurate because they contradict the dimension recited in claim 1. As the Examiner will note, claims 7 and 9 have been amended to eliminate the inaccuracy, and accordingly, it is believed that this objection has been eliminated.

Claims 1-3, 8, 10-15 and 18 have been rejected by the Examiner under 35 U.S.C. § 102(b) as being anticipated by the acknowledged prior art. In addition, claims 19-20 have been rejected by the Examiner under 35 U.S.C. § 103(a) as being unpatentable over Winchell '578. These rejections are respectfully traversed.

It is noted, with appreciation, that the Examiner has indicated that claims 4-6, 7, 9 and 16-18, although objected to as being dependent upon a rejected base claim, would be allowable if rewritten in independent form for including all of the limitations of the base claim and any intervening claims. As the Examiner will note, original claim 1 has been amended to include the allowable subject matter of claim 6, and correspondingly claim 6 has been

cancelled from the present application. Also, the allowable subject matter of claim 4 has been combined with original claim 1 and rewritten as newly added claim 21. The allowable subject matter of claim 7 has been added to claim 1 and rewritten as newly added claim 22. The allowable subject matter of claim 9 has been combined with claim 8 and added to claim 1 and rewritten as newly added claim 23. Newly added claim 24 represents a substantial combination of original claim 1 and claim 7 with some minor variations thereof. Newly added claim 25 has been added to the present application to reflect a combination of a magnetic recording/reproducing apparatus containing the clutch device of the present invention. All of the remaining claims in the present application have been amended so as to be dependent from claims which the Examiner has indicated as containing allowable subject matter.

Accordingly, in view of the amendments made to the claims as discussed hereinabove, it is believed that the present application is in condition for allowance. Thus, reconsideration of the objections and rejections and allowance of the claims of the present application are respectfully requested.

Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants hereby petition for an extension of two (2) months to August 13, 2003 in which to file a reply to the Office Action. The required fee of \$410.00 is enclosed herewith.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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 Clean Copy of Specification

A CLUTCH DEVICE FOR MAGNETIC RECORDING/REPRODUCING APPARATUS

BACKGROUND OF THE INVENTION

5

1. Field of the Invention

The present invention relates to a magnetic recording/reproducing apparatus, and in particular to a clutch device for a magnetic recording/reproducing apparatus which is capable of transmitting a power for
10 traveling regularly conveying a tape, ~~regularly~~ regardless of a the quantity of the tape, wound around a reel.

2. Description of the Prior Art

Figure 1 illustrates a tape travelling path conveying structure of a general
15 magnetic recording/reproducing apparatus.

As shown in Figure 1, a supplying reel driving body 1 and a winding reel driving body 21 are installed to drive a supplying reel (not shown) and a winding reel (not shown) of a tape cassette (not shown) at one side of a main chassis (C).

A plurality of posts and guide rollers are ~~installed~~ provided on the main
20 chassis (C) to guide ~~travelling~~ the path of a tape (T) released from a tape cassette.

A tension post 3 for controlling a the tensile force of a the travelling tape (T) is installed at on a tension arm 4.

The tension arm 4 is rotated at a predetermined angle according to the tension of the tape (T) on the main chassis (C) centering around a shaft pin 2, ~~for~~
25 on which the tension arm 4 is elastically supported by a spring 5.

The tape (T) having passed the tension post 3 is guided by a guide post 6 and transmitted to a full width erasing head 7.

The full width erasing head 7 removes, in advance, a signal which has been recorded on the tape in a recording mode.

5 An inertia roller is installed at a position past the full width erasing head 7 to guide the ~~travelling~~ path of the tape (T).

Next, the tape (T) is guided by guide posts 10 and 11 of the supplying and winding side which are moved along loading paths formed at both sides of a rotational head drum 9.

10 The guide posts 10 and 11 ~~draws~~ draw the tape (T) from the inside of the tape cassette, ~~the~~ a position indicated ~~in~~ by a dotted line as shown in Figure 1, so as to be wound and traveled.

A supplying slant post 12 and a winding slant post 13 are provided next to the guide posts 10 and 11 ~~toward~~ and in the direction of the rotational head drum 9, so as to guide the ~~traveling~~ conveyance of the tape (T).

15 The guide posts 10 and 11 and the slant posts 12 and 13 are installed on a respective supplying and winding slant bases 14 and 15 and moved along the loading path.

As shown in Figure 1, the rotational head drum 9, on which the tape (T) is wound and ~~traveled~~ conveyed, is provided with a rotational head (not shown) for reading a signal recorded on the tape (T) or for recording a signal.

20 The tape (T) passes the rotational head drum 9 and the slant post 13 and the guide post 11 of the winding side and then passes the audio control head 16. The audio control head 16 ~~performs deleting, recording~~ deletes, records and

~~reproducing of~~ reproduces an audio signal, and ~~recording~~ records and ~~reproducing~~ reproduces a control signal.

A guide post 17 is provided on the main chassis (C), ~~at an adjacent location~~
of to the audio control head 16 ~~to control~~ for controlling the traveling height of the
5 tape (T).

A capstan shaft 18 for providing a traveling force to the tape (T) is installed
at a position ~~passing~~ past the guide post 17. The capstan shaft 18 is an output
shaft of a capstan motor (not shown) installed at the opposite face of the main
chassis (C), and a the traveling direction of the tape (T) is determined ~~depending~~
10 ~~on~~ by the rotational direction of the capstan motor.

A pinch roller 19 is ~~installed~~ selectively installed to ~~tightly attached to~~
tightly engage the capstan shaft 18 to provide a force for pulling the tape (T).

A winding post 20 is provided ~~at an adjacent~~ to the location of the pinch
roller 19 and the capstan shaft 18. A winding arm (not shown) is installed and
15 moved at the winding post 20.

Between the supplying reel driving body 1 and the winding reel driving
body 21, a clutch assembly 22 is installed to drive the ~~supplying~~ supply reel or the
winding reel at a certain torque, regardless of the amount of the tape (T) wound on
the supplying reel or the winding reel, upon receipt of a driving force received from
20 the capstan motor.

An idler gear 24 is installed at a front end of an idler arm 25 which is
coaxially installed with the clutch assembly 22. The idler gear 24 is adopted to
selectively ~~connected to~~ engage either the ~~supplying~~ supply reel driving body 1 or
the winding reel driving body 21 for transferring a driving force thereto upon
25 receipt of a the driving force from the clutch assembly 22.

A tension brake 27 is ~~installed~~ wound on the supplying reel driving body 1 with its both of its ends fixed at to the tension arm 4. The tension brake 27 controls the rotational speed of the supplying reel driving body 1 according to the operation of the tension arm 4, thereby controlling a the tension of in the tape (T).

5 The construction of the clutch assembly 22 will be described in detail with reference to accompanying Figures 2 and 3.

As depicted in Figures 2 and 3, a ~~central~~ central shaft 30 is installed on the main chassis C. A driving pulley 32d is installed so as to rotate centering around the ~~central~~ central shaft 30. A belt 31 ~~receiving a~~ which receives power
10 from the capstan motor is wound around the driving pulley 32 ~~and it receives a~~ rotational 32d for transferring the rotational force of the capstan motor. A cylindrical clutch holder 34 is installed ~~to~~ on the driving pulley 32.

And, A an up/down gear 36 is installed ~~to~~ on the ~~central~~ central shaft 30 on the same axis as the driving pulley 32d. The up/down gear 36 transmits a the
15 power of from the capstan motor by selectively engaging ~~with~~ the idler gear 24. Clutch springs 18, 18' are installed to the up/down gear 36. The clutch springs 18, 18' are wound around the outer circumferential surface of the cylindrical clutch holder 34. Herein, the lower spring 18 and the upper spring 18' are wound ~~around~~ in the opposite ~~direction~~ directions.

20 ~~Accordingly, according~~ According to the rotational direction of the driving pulley 32d, for example, when the lower spring 18 is locked and the upper spring 18' rubs against the surface of the clutch holder 34, a slip ~~occurs, accordingly~~ traveling occurs. Accordingly, the movement of the tape (T) can be performed with a regular torque regardless of a the quantity of the tape (T) wound around the
25 reel.

In the meantime, a first gear portion 37 and a second gear portion 37' are formed at on the up/down gear 36, the first and the second gear portions 37, 37' ~~reduce~~ reducing and ~~transmit the~~ transmitting power by respectively and selectively engaging with gear portions of the idler gear 24.

5 The idler gear 24 is rotatably installed on the front end portion of the idler arm 25, ~~installed rotatable~~ centering around the ~~central~~ central shaft 30, each gear portion (not shown) selectively engaging ~~with~~ the first and the second gear portions 37, 37' of the up/down gear 36 ~~is formed at the idler gear 24~~. The idler gear 24 ~~transmits~~ transmits the power of the capstan motor to the supplying reel
10 and the winding reel by selectively engaging with the ~~supplying~~ supply reel body 1 and the winding reel body 21.

However, the above-mentioned conventional magnetic recording/reproducing apparatus has ~~below~~ the following problems.

15 The clutch springs 18, 18' are selectively used for ~~traveling of~~ conveying the tape (T) with a regular tension, regardless of a the quantity of ~~the~~ tape (T) wound ~~around~~ around the ~~supplying~~ supply reel and the winding reel, ~~herein the clutch springs 18, 18' are selectively used~~ reel in accordance with a traveling direction of the tape (T).

20 In this use of ~~the~~ clutch springs 18, 18', a production ~~cost is~~ costs are increased due to ~~lots~~ the large amount of construction parts. In addition, ~~an~~ the operation efficiency of ~~an~~ the assembly process is ~~lowered~~ reduced.

SUMMARY OF THE INVENTION

In order to solve above-mentioned problems, it is an object of the present invention to provide a clutch device for a magnetic recording/reproducing apparatus which is capable of reducing a production cost and improving ~~an~~ the efficiency of ~~an~~ the assembly operation by minimizing the number of components.

5 In order to achieve the above-mentioned object, a clutch device for a magnetic recording/reproducing apparatus ~~comprises~~ is provided which includes a rotating ~~central~~ central shaft installed on a main chassis; a driving pulley installed ~~to on~~ the rotating ~~central~~ central shaft, ~~rotating~~ central shaft which rotates by receiving a power ~~of~~ from a driving source and having a cylindrical pulley holder portion; an
10 up/down gear ~~having~~ containing a cylindrical gear holder unit having an outer diameter smaller than an inner diameter of the pulley holder portion and being ascendable/descendable along ~~the~~ a rotating ~~central~~ central shaft; and a clutch spring placed between the inner surface of the pulley holder portion and the outer surface of the gear holder unit ~~and~~ for selectively transmitting a power with a
15 certain torque from the driving pulley to the up/down gear in accordance with the rotational direction of the driving pulley.

The clutch spring has a coil spring structure, with the end of the clutch spring ~~is contacted to~~ contacting the inner surface of the pulley holder portion, and the other end of the clutch spring ~~is contacted to~~ contacting the outer surface of
20 the gear holder unit.

~~A certain~~ Certain portions of the pulley holder portion and the gear holder unit are formed so as to project out toward the clutch spring in order to ~~contact~~ engage the clutch spring.

The gear holder unit includes an outer cylindrical portion having an inner diameter larger than an inner diameter of the pulley holder portion and connected to the pulley holder portion.

5 The driving pulley and the up/down gear respectively include an engaging means ~~in order to rotate together by being meshed with each other~~ which enables them to mesh and rotate together when the up/down gear is transferred toward the driving pulley.

10 The driving pulley and the up/down gear respectively include a movement restriction means restricting the up/down gear ~~not to~~ from moving ~~ever~~ in a specific range when the up/down gear moves in a direction separated from the driving pulley.

The up/down gear is constructed with a gear unit having a large gear and a small gear and ~~the~~ a gear holder unit, and the gear unit and the gear holder unit are combined with each other.

15 A boss portion is formed at the center of the gear unit, with the large gear is being formed at a disc-shaped portion ~~extended~~ which extends from the boss portion, ~~and the portion.~~ The small gear ~~having~~ which has a diameter smaller than a the diameter of the large gear is formed at the side of the disc-shaped portion.

20 A cylindrical holder supporting portion is formed at the other side of the gear unit so as to support the gear holder unit.

The gear holder unit is constructed with an inner ~~cylinder~~ cylindrical portion and an outer ~~cylinder~~ cylindrical portion, and the clutch spring ~~is contacted to~~ contacts the inner ~~cylinder~~ cylindrical portion, and an engaging rib is formed at the outer cylindrical portion.

The inner cylindrical portion has a hook structure ~~so as to engage~~ for engaging with the ~~driving drive~~ pulley.

~~A driving~~ The drive pulley of a clutch device for a magnetic recording/reproducing apparatus ~~comprises~~ includes a pulley body formed as a disc shape and with a belt is wound around the outer circumference thereof; a boss portion combined with a rotating ~~central~~ central shaft; a ~~bridging~~ bridge portion projected so as to restrict a the movement of an up/down gear; a pulley holder portion ~~at which~~ having an inner surface in contact with a clutch spring is ~~contacted to its inner surface~~; and an engaging rib combined with an up/down gear ~~so as to rotate~~ for rotating together; wherein the boss portion, the bridging portion, the pulley holder portion and the engaging rib are formed as in a cylindrical shape and orderly ~~placed~~ positioned from the center of the pulley body.

A clutch spring of a clutch device for a magnetic recording/reproducing apparatus ~~comprises~~ includes an inner contacting portion ~~formed at a certain~~ portion, contacted to for engaging an up/down gear and having ~~respectively lots of~~ a plurality of windings; an outer contacting portion ~~placed at the other~~ portion, contacted to for engaging a ~~driving drive~~ pulley and having ~~respectively~~ a plurality of windings; and a connecting portion connecting the inner contacting portion and the outer contacting portion and ~~having the number~~ containing a plurality of windings less than those of the inner contacting portion and the outer contacting portion.

A The diameter of the inner contacting portion is formed ~~so as to be~~ smaller than a the diameter of the outer contacting portion.

Accordingly, a clutch device for a magnetic recording/reproducing apparatus in accordance with the present invention is capable of reducing a

production cost and improving ~~an~~ the efficiency of an assembly operation by minimizing the number of components.

BRIEF DESCRIPTION OF THE DRAWINGS

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Figure 1 is a plan view showing a tape ~~traveling~~ conveying structure of a general magnetic recording/reproducing apparatus;

Figure 2 is a sectional view illustrating a the structure of a clutch device for the magnetic recording/reproducing apparatus taken along the line A-A of Figure
10 1;

Figure 3 illustrates, in detail, a the combination structure of a the clutch holder and a the spring of Figure 2;

Figure 4 is a sectional view illustrating a clutch device for a magnetic recording/reproducing apparatus in accordance with the present invention;

15 Figure 5 is a sectional view illustrating a combination structure of a ~~driving~~ drive pulley, an up/down gear and a clutch spring;

Figure 6 is a sectional view illustrating a the structure of a clutch spring of the clutch device in accordance with the present invention; and

Figures 7A, 7B, ~~8a~~ 8A and 8B are state diagrams illustrating the operation
20 of the clutch device in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereinafter, the preferred embodiments of a clutch device for a magnetic recording/reproducing apparatus in accordance with the present invention will be described with reference to accompanying drawings.

There ~~Although there~~ may be a plurality of embodiments of a magnetic
5 recording/reproducing apparatus in accordance with the present invention, hereinafter the preferred embodiment will be described.

As depicted in Figure 4, a clutch assembly 60 is installed on a main chassis 50. In ~~traveling of~~ conveying a tape T by transmitting a power provided from a capstan motor to a ~~supplying~~ supply reel and a winding reel, the clutch assembly
10 60 performs the ~~traveling~~ conveyance of the tape T with a regular tension, regardless of a the quantity of the tape T wound around the ~~supplying~~ supply reel and ~~the~~ winding reel.

In the structure of the clutch assembly 60, a ~~centrical~~ central shaft 62 is formed on the main chassis 50. A driving pulley 64 is rotatably installed ~~to~~ at the
15 ~~centrical~~ central shaft 62 ~~so as to be rotatable~~. The driving pulley 64 receives a power transmitted from the capstan motor through a belt 65, and a cylindrical pulley holder 66 is formed at the inside of the driving pulley 64 on the same axis as the ~~centrical~~ central shaft 62. ~~And, an~~ An engaging rib 68 is formed on the driving pulley 64, ~~corresponded to the exterior of~~ to the pulley holder 66.

20 An up/down gear 70 is installed to the ~~centrical~~ central shaft 62 so as to move in an axial direction along the ~~centrical~~ central shaft 62. A sliding hole 72 in which the ~~centrical~~ central shaft 62 penetrates is formed at the center of the up/down gear 70. A large gear 74 and a small gear 75 are formed ~~at~~ on the up/down gear 70 in order to transmit the power received from the driving pulley 64
25 to an idler gear 102. The large gear 74 engages with the small gear 106 of the

idler gear 102 in a fast traveling mode, and the smaller gear 75 engages with the large gear 104 of the idler gear 102 in a normal traveling mode ~~in order to transmit the for transmitting~~ power.

A gear holder 76 is formed at the up/down gear 70 so as to face with the pulley holder 66 of the ~~driving~~ drive pulley 64. The gear holder 76 has a cylindrical shape in which an inner cylindrical portion 76b and an outer cylindrical portion 76a having the same axis as the central shaft 62 are connected to each other. The inner cylindrical portion 76b of the gear holder 76 is inserted into the pulley holder 66 so as to be ascendable. Accordingly, the outer diameter of the inner cylindrical portion 76b of the gear holder 76 is formed so as to be smaller than the inner diameter of the pulley holder 66.

~~And, an~~ An engaging rib 78 is formed at the outer cylindrical portion 76a of the gear holder 76 in order to rotate the up/down gear 70 and the ~~driving~~ drive pulley 64 as one body in the fast traveling mode by engaging with them when the up/down gear 70 moves toward the ~~driving~~ drive pulley 64.

The ~~driving~~ drive pulley 64 includes a movement restriction means in order to restrict the up/down gear 70 not to ~~moving~~ move over a specific range when the up/down gear 70 moves in a direction separated from the ~~driving~~ drive pulley 64.

In more detail, a cylindrical bridging portion 64b is formed so as to project into the gear holder unit 76, and the movement restriction means is formed so as to engage the bridging portion 64b with the inner cylindrical portion 76b of the gear holder 76 as a hook structure.

A clutch spring 80 is installed between the ~~driving~~ drive pulley 64 and the up/down gear 70. The clutch spring 80 is constructed as a coil spring structure. As depicted in Figure 6, in the clutch spring 80, an outer contacting portion 82 is

formed at the lower portion thereof so as to contact ~~to~~ the inner surface of the pulley holder 66 of the driving pulley 64, ~~and an~~ 64. ~~The~~ inner contacting portion 84 is formed at the upper portion so as to contact ~~to~~ the outer surface of the gear holder 76. ~~And, the~~ The outer contacting portion 82 and the inner contacting
5 portion 84 are connected to each other through a connecting portion 86.

In the connecting portion 86, connecting the outer contacting portion 82 and the inner contacting portion 84 in order to form the clutch spring 80 as one body, the number of windings is less than those of the outer contacting portion 82 or the inner contacting portion 84.

10 The clutch spring 80 is wound when it is rotated in ~~a certain~~ one direction and is unwound when it is rotated in the other ~~direction, the~~ direction. ~~The~~ outer contacting portion 82 and the inner contacting portion 84 are ~~respectively contacted to~~ in contact with the inner surface of the pulley holder 66 and the outer surface of the gear holder 76, respectively.

15 Accordingly, when the driving pulley 64 rotates in a certain direction, the outer contacting portion 82 and the pulley holder 66 are closely ~~contacted~~ contact each other, while the contact of the inner contacting portion 84 and the gear holder 76 is ~~loosened, accordingly~~ loosened. Accordingly a specific torque ~~can be~~ is transmitted by a slip. When the driving pulley 64 rotates in the other direction, the
20 inner contacting portion 84 and the gear holder 76 are closely ~~contacted,~~ contact each other and the contact ~~of~~ between the outer contacting portion 82 and the pulley holder 66 is ~~loosened, accordingly~~ loosened. Accordingly, a specific torque ~~can be~~ is transmitted by a slip.

Herein, in the pulley holder 66 and the gear holder 76, the inner portion 66a and the outer portion 76c are formed so as to project toward the clutch spring 80 in order to smoothly contact to the clutch spring 80 ~~smoothly~~.

In the meantime, the driving pulley 64, the up/down gear 70 and the clutch spring 80 are described in more detail with reference to accompanying Figures 5 and 6.

First, the ~~driving~~ drive pulley 64 includes a pulley body 64a having a disc shape in which a belt 54 is wound on the outer circumference, a boss portion 64c combined with the rotation ~~centrical~~ central shaft 62, ~~the a~~ bridging portion 64b projecting in order to restrict the movement of the up/down gear 70 by combining with the inner cylindrical portion 76b of the up/down gear 70 as a hook structure, ~~the a~~ pulley holder 66 with its inner surface ~~is contacted to~~ in contact with the clutch spring 80, and ~~the an~~ engaging rib 68 combined with the up/down gear 70 so as to enable them to rotate together.

The boss portion 64c, the bridging portion 64b, the pulley holder 66 and the engaging rib 68 have a cylindrical shape and are orderly placed from the center of the pulley body 64a.

Next, the up/down gear 70 includes a gear unit 71 having a large gear 74 ~~and~~ a small gear 75 and ~~the~~ gear holder 76, and the gear unit 71 and the gear holder 76 are combined with each other.

In the gear unit 71, a boss portion 73 having a sliding hole 72 is formed at the ~~centrical~~ central portion, ~~the a~~ large gear 74 is formed at the disc-shaped portion extended from the boss portion 73, and ~~the a~~ small gear 75 having a diameter smaller than a diameter of the large gear 74 ~~is projected~~ projects from the side of the disc-shaped portion.

In addition, a cylindrical holder supporting portion 77 is formed at the gear unit ~~74 so as to be~~ 71, opposite to the small gear 75 in order to support the gear holder 76.

Next, ~~in~~ In the clutch spring 80, as depicted in Figure 6, a the diameter D1 of the inner contacting portion 84 is smaller than a the diameter D2 of the outer contacting portion 82.

In the meantime, a converting lever 90 is installed on the main chassis 50 in order to ascend and descend the up/down gear 70. The converting lever 90 is operated by an additional driving member (not shown). An idler arm 100 is installed ~~so as to rotate at a certain angle centering around the central~~ central shaft 62. An idler gear 102 is installed at the idler arm 100. A large gear 104 and a small gear 106 are formed at the idler gear ~~402, accordingly~~ 102. Accordingly the idler gear 102 ~~can receive the~~ receives power by engaging with the small gear 75 and the large gear 74 of the up/down gear 70.

As depicted in Figure 4, a reference numeral 110 is a ~~supplying~~ supply reel body for operating a ~~supplying the supply~~ reel of a ~~tape, a~~ tape. A slave gear 112 which selectively ~~engaging~~ engages with the large gear 102 of the idler gear 102 is formed at the ~~supplying~~ supply reel body 110. A winding reel body is formed at the opposite side of the ~~supplying~~ supply reel body 110, ~~it is abridged in Figure 4.~~

~~Hereinafter, the~~ The operation of the clutch device for ~~the~~ a magnetic recording/reproducing apparatus in accordance with the present invention will now be described in detail.

The clutch assembly 60 transmits a regular torque to the ~~supplying~~ supply reel body 110 and the winding reel body (not shown) for ~~traveling of a~~ conveying

the tape T with a regular tension, regardless of a the quantity of the tape T wound around the ~~supplying~~ supply reel or the winding reel.

In more detail, when the rotational force of the capstan motor is transmitted through the belt 65, the power is transmitted through the driving drive pulley 64,
5 the clutch spring 80, the up/down gear 70 and the idler gear 102.

The power transmission process will be described with reference to accompanying Figures 7A, 7B, 8A and 8B.

For example, as depicted in Figures 7A and 7B, when the driving pulley 64 rotates in the counter clockwise direction, when the rotational direction of the
10 driving pulley 64 is the same with the winding direction of the clutch spring 80 (shortening a diameter), the inner contacting portion 84 of the clutch spring 80 is ~~closely contacted to~~ in close contact with the exterior of the gear holder 76, the and contact of the outer contacting portion 82 of the clutch spring 80 with the inner surface of the pulley holder 66 is loosened (~~It~~ This is exaggerated in Figures 7A
15 and 7B).

Then, a slip occurs between the outer contacting portion 82 and the pulley holder ~~66, a~~ 66 so that regular power can be transmitted.

In the meantime, as depicted in Figures 8A and 8B, when the driving pulley 64 rotates in the clockwise direction, the diameter of the clutch spring 80 is
20 lengthened. Herein, the inner contacting portion 84 is loosened from the gear holder 76, so that a slip occurs ~~between them, accordingly a there-between.~~ Accordingly, specific power can be ~~transmitted. And,~~ transmitted the outer contacting portion 82 is ~~closely contacted to~~ in close contact with the inner surface of the pulley holder 66.

In the meantime, as depicted in Figure 4, the converting lever 90 is rotatively installed on the main chassis 50. In more detail, the end of the converting lever 90 is hinge-connected to the main chassis 50, and the other end of the converting lever 90 is placed on a protrusion portion 79 ~~projected-out~~
5 projecting from the outer circumference of the outer cylindrical portion 76a of the gear holder 76.

When the converting lever 90 is rotated at the hinge portion by an additional driving member (not shown) installed ~~to~~ on the main chassis 50, the end of the converting lever 90 rotates downwardly. Accordingly, ~~it-pushes~~ the protrusion
10 portion 79 is pushed, the gear holder 76 moves downwardly in Figure 4, and the engaging rib 78 of the gear holder 76 combines with the engaging rib 68 of the driving pulley 64. Herein, the ~~connection~~ connecting portion 86 of the clutch spring 80 generates an elastic force moving the gear holder 76 upwardly while being compressed. ~~It~~ This is described in Figure 5.

15 Accordingly, the rotational force of the driving pulley 64 is directly transmitted to the gear holder 76 through the engaging ribs 68, 78 without transmitting the torque of the clutch spring 80.

As described above, in a clutch assembly for a magnetic recording/reproducing apparatus in accordance with the present invention, the
20 interior of the upper portion and the exterior of the lower portion of a clutch spring are respectively ~~contacted to~~ in contact with a gear holder of an up/down gear and a pulley holder of a driving ~~pulley, a~~ pulley. The position at which a slip occurs is varied according to a the rotational direction of the driving pulley, and a regular torque can be transmitted. Accordingly, a torque adjustment according to the two-
25 way rotation of the ~~iving~~ driving pulley can be performed with one spring.

Accordingly, a clutch device for a magnetic recording/reproducing apparatus in accordance with the present invention can reduce a production cost and simplify ~~an~~ the assembly process by minimizing the number of components.

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ABSTRACT

~~In a~~ A clutch device for a magnetic recording/reproducing apparatus for
transmitting a power for ~~traveling~~ of a tape conveying regardless of a the quantity
5 of the tape wound around a reel, ~~a clutch device for a magnetic~~
~~recording/reproducing apparatus comprises~~ including a rotating ~~central~~ central
shaft installed on a main chassis, a ~~driving~~ drive pulley ~~installed~~ connected to the
rotating ~~central~~ central shaft, and having a cylindrical pulley holder portion,
~~rotating~~ said drive pulley being rotated by receiving a power ~~of~~ from a driving
10 source, ~~and having a cylindrical pulley holder portion,~~ an up/down gear having a
cylindrical gear holder unit ~~having an~~ with the outer diameter thereof being smaller
than ~~an~~ the inner diameter of the pulley holder portion and
ascendable/descendable along the ~~rotating central~~ rotatable central shaft, and a
clutch spring placed between the inner surface of the pulley holder portion and the
15 outer surface of the gear holder unit ~~and~~ for selectively transmitting a power with a
certain torque from the driving pulley to the up/down gear in accordance with the
rotational direction of the driving pulley, ~~accordingly a production cost can be~~
~~reduced by minimizing the number of components and an assembly process can~~
~~be simplified.~~

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